REMARKS

Claims 1-42 are pending in this application. Claims 1-6, 11, 15, 19-23, 33, 37, and 41-42 have been amended to clarify the subject matter of the present invention. No new matter has been introduced.

Claims 1-20 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the invention. (Office Action at 2). Independent claim 1 has been amended to recite that removal of the insulating material exposes "at least one upper surface of said top conductive layer." Applicant submits that all pending claims are now in full compliance with 35 U.S.C. §112.

Claims 1-42 stand rejected under 35 U.S.C. 102(e) as being anticipated by Sandhu et al. (U.S. Patent No. 6,358,756 B1) ("Sandhu"). This rejection is respectfully traversed.

The claimed invention relates to a method of forming a magnetic random access memory. As such, amended independent claim 1 recites a "method of forming a magnetic random access memory" by *inter alia* "forming a plurality of spaced apart magnetic memory element stacks over said plurality of first conductive layers, wherein each of said magnetic memory element stacks is formed by the steps of forming a first magnetic layer over a corresponding first conductive layer and forming a second magnetic layer over said first magnetic layer, said second magnetic layer having an associated top conductive layer" and "forming an insulating material over and in between said spaced apart magnetic memory element stacks." Amended independent claim 1 also recites "removing at least a portion of said insulating material over at least one of said memory element stacks to expose the top conductive layer of said at least one memory element stack."

Amended independent claim 21 recites a "method of forming a magnetic random access memory" by *inter alia* "forming a plurality of spaced apart magnetic memory element stacks over said plurality of first conductive layers, wherein each of said magnetic memory element stacks is formed by the steps of forming a first magnetic layer

over a corresponding first conductive layer and forming a second magnetic layer over said first magnetic layer, said second magnetic layer having an associated a top conductive layer" and "forming an insulating material over and in between said spaced apart magnetic memory element stacks." Amended independent claim 21 also recites "removing at least a portion of said insulating material to expose upper surfaces of a plurality of said memory element stacks."

Sandhu relates to a method of fabricating a MRAM structure utilizing a spacer containment scheme. Sandhu teaches "a spacer processing technique, whereby the upper magnetic layer of the MRAM stack structure is formed between the region defined by the spacers, thereby allowing for self-alignment of the upper magnetic layer over the underlying pinned magnetic layer."

Sandhu fails to disclose all limitations of amended independent claim 1 and amended independent claim 21. Sandhu fails to teach or suggest "forming an insulating material *over and in between* said spaced apart magnetic memory element stacks," as amended independent claim 1 recites (emphasis added). Sandhu also fails to teach or suggest "forming an insulating material *over and in between* said spaced apart magnetic memory element stacks," as amended independent claim 21 recites (emphasis added).

Sandhu teaches the formation of second (24), third (32) and fourth (38) insulating layers (col. 5, lines 54-59; col. 6, lines 1-11; Figure 5); however, none of these insulating layers are formed "over and in between said spaced apart magnetic memory element stacks," as in the claimed invention. As illustrated in Figure 5 of Sandhu, insulating layer 24 is not formed "over" M2 layer 28. Similarly, insulating layers 32 and 38 are not formed "in between" M1 and M2 layers 20, 28.

Sandhu also fails to teach or suggest "removing at least a portion of said insulating material over at least one of said memory element stacks to expose the top conductive layer of said at least one memory element stack," as amended independent claim 1 recites, or "removing at least a portion of said insulating material to expose upper surfaces of a plurality of said memory element stacks," as amended independent claim 21 recites.

Sandhu teaches that M2 layer 28 is formed within areas defined by spacers 26 and over layer 22. (Column 5, lines 32-40). Sandhu also teaches that tantalum barrier layer 30 is formed over the M2 layer 28 (column 5, lines 40-52; Figure 4), but not as an upper surface of the M2 layer 28, which would arguably correspond to the second magnetic layer of the claimed invention. Sandhu teaches insulating layers 24, 32 and 38 (column 5, lines 54-60; column 6, lines 1-10), but Sandhu fails to teach or suggest removing portion of insulating material "to expose the top conductive layer of said at least one memory element stack," as in recited in amended independent claim 1. For at least these reasons, Sandhu fails to disclose all limitations of claims 1-42, and withdrawal of the rejection of these claims is respectfully requested.

A marked-up version of the changes made to the claims by the current amendment is attached. The attached page is captioned "**Version with markings to show changes made.**"

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Dated: April 10, 2003

Respectfully submitted,

By____________________

Thomas J. D'Amico
Registration No.: 28,371
Gabriela Coman
Registration No.: 50,515
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP
2101 L Street NW
Washington, DC 20037-1526
(202) 785-9700
Attorneys for Applicant

Version With Markings to Show Changes Made

1. (Twice Amended) A method of forming [at least one contact in] a magnetic random access memory [cell structure], said method comprising:

forming a plurality of spaced apart first conductive layers over an insulating layer formed over a substrate;

forming a plurality of spaced apart magnetic memory element stacks [first magnetic layers] over said plurality of first conductive layers[;], wherein each of said magnetic memory element stacks is formed by the steps of forming a first magnetic layer over a corresponding first conductive layer and forming a [plurality of] second magnetic layer [layers] over said first magnetic layer [layers], [each of] said [plurality of] second magnetic layer having an associated [layers comprising a] top conductive layer;

forming an insulating material over and in between said spaced apart magnetic memory element stacks [in between each said plurality of first magnetic layers, in between each said plurality of second magnetic layers and over both said first and second magnetic layers]; and

removing at least a portion of said insulating material over at least one of said memory element stacks to expose [at least one upper surface of said] the top conductive layer of said at least one memory element stack.

2. (Amended) The method of claim 1, wherein said act of removing at least a portion of said insulating material further comprises exposing an [a plurality of] upper [surfaces] surface of said top conductive layer [layers respectively associated with said second magnetic layers].

3. (Amended) The method of claim 1, further comprising forming a nonmagnetic layer [layers] between said second magnetic layer [layers] and said first magnetic layer [layers].

4. (Amended) The method of claim 2, <u>wherein said insulating material is removed to expose an upper surface of a plurality of top conductive layers associated with respective memory element stacks, said method</u> further comprising forming a plurality of second conductors each in electrical connection with a plurality of said exposed upper surfaces [of said conductive layers], said plurality of second conductors running substantially orthogonal to said <u>plurality of first</u> conductive layers.

5. (Amended) The method of claim 1, wherein said act of removing <u>at least a</u> portion of said insulating material further comprises chemical mechanical polishing of said insulating material to expose [said] <u>an</u> upper surface of said <u>top</u> conductive layer.

6. (Amended) The method of claim 1, wherein said <u>top</u> conductive layer is formed of a material selected from the group consisting of tungsten nitrogen, tungsten, gold, platinum and copper.

11. (Amended) The method of claim 1, wherein said act of forming said first magnetic <u>layer</u> [layers] further comprises the step of forming a first plurality of stacked layers, said first plurality of stacked layers including at least one magnetic material layer.

15. (Amended) The method of claim 1, wherein said act of forming said second magnetic <u>layer</u> [layers] further comprises forming a second plurality of stacked layers, said second plurality of stacked layers including at least one magnetic material layer and said conductive layer.

19. (Amended) The method of claim 1, wherein said first magnetic <u>layer has</u> [layers have] a pinned magnetic orientation.

20. (Amended) The method of claim 1, wherein said second magnetic layer has [layers have] a free magnetic orientation.

21. (Twice Amended) A method of forming a [plurality of self-aligned contacts in respective] magnetic random access memory [cell structures], said method comprising:

forming a plurality of spaced apart first conductive layers over an insulating layer formed over a substrate;

forming a plurality of spaced apart magnetic memory element stacks [first magnetic layers] over said plurality of first conductive layers[;], wherein each of said magnetic memory element stacks is formed by the steps of forming a first magnetic layer over a corresponding first conductive layer and forming a [plurality of] second magnetic layer [layers] over said first magnetic layer [layers], [each of] said [plurality of] second magnetic layer having an associated [layers comprising] a top conductive layer;

forming an insulating material [over said substrate, over both said plurality of first and second magnetic layers including said top conductive layers, and in between] over and in between said spaced apart magnetic memory element stacks [each said plurality of first magnetic layers and each said plurality of second magnetic layers];

removing at least a portion[s] of said insulating material [from said top conductive layers] to expose [a plurality of] upper surfaces of a plurality of said memory element stacks [said top conductive layers associated with said second magnetic layers]; and

forming a plurality of spaced apart second conductive layers over respective sets of said exposed upper surfaces [self-aligned contacts], said second conductive layers running substantially orthogonal to said first [magnetic] conductive layers, one of said first and second conductive layers being bit lines and the other of said first and second conductive layers being word lines.

22. (Amended) The method of claim 21, further comprising forming a [plurality of] nonmagnetic layer [layers] between said first magnetic layer and said second magnetic layer [plurality of second magnetic layers and said plurality of first magnetic layers].

23. (Amended) The method of claim 22, wherein said nonmagnetic layer is [layers are] formed of a material selected from the group consisting of aluminum oxide, titanium oxide, magnesium oxide, silicon oxide and aluminum nitride.

33. (Amended) The method of claim 21, wherein said act of forming said [plurality of] first magnetic layer [layers] further comprises the step of forming a first plurality of stacked layers, said first plurality of stacked layers including at least one magnetic material layer.

37. (Amended) The method of claim 21, wherein said act of forming said [plurality of] second magnetic layer [layers] further comprises forming a second plurality of stacked layers, said second plurality of stacked layers including at least one magnetic material layer and said top conductive layer.

41. (Amended) The method of claim 21, wherein said first magnetic layer has [layers have] a pinned magnetic orientation.

42. (Amended) The method of claim 21, wherein said second magnetic layer has [layers have] a free magnetic orientation.